Designed for Video Editing
and
Content Creation Professionals

PRO FC

Installation and User's Manual

Document 900-0011-0 v1.2

Table of Content

1. Introduction 3
1.1. Safety Considerations 4
1.1.1. SAFETY CONSIDERATIONS 4
1.1.2. CONSIDÉRATIONS DE SÉCURITÉ 5
1.1.3. SAFTY BERÜCKSICHTIGUNGEN 6
1.1.4. CONSIDERACIONES DE SEGURIDAD 7
1.2. System Requirements 8
1.3. Technical Support 8
2. Getting Started 9
2.1. Packaging 9
2.2. Check List 9
3. Overview 10
3.1. The Bezel 10
3.2. Disk Modules, Indicators, Controls, Connections 10
4. Installation 12
4.1. Rackmount Installation 12
4.2. Disk Module Installation 13
4.3. FC Cable Installation 14
4.4. Drivers 14
4.5. Ethernet Configuration 14
4.6. RAID Manager Installation 15
5. RAID Manager Operations 16
5.1. Start RAID Manager 16
5.2. Connect RAID Manger to PRO FC 16
5.2.1. PRO FC Discovery 16
5.2.2. Login 17
5.3. RAID System Information 18
5.4. RAID Creation 20
5.5. RAID Deletion 23
5.6. Create >2TB RAID Set for Windows XP (32bit): 25
6. Alarm Conditions / Degraded RAID Set 26
6.1. Replacing a Disk Module 27
7. Formatting and Partitioning 28
7.1. Apple OS X Formatting 28
7.1.1. Erase an existing partition 28
7.1.2. Create a new partition 29
7.2. Windows XP / Vista Formatting 30
8. RAID Level Descriptions 32
9. Product Registration 34

1. Introduction

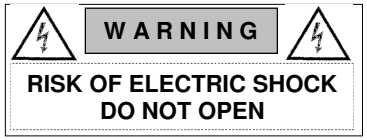
We appreciate your purchase of this product from Dulce Systems. You have everything you need to quickly and easily connect the storage unit to your editing computer. You are a short time way from your next blockbuster creation.

This Installation and User's Manual is intended to streamline the process of getting your RAID storage system up and running so you can get to work quickly.

For most typical video editing storage requirements, we have preconfigured the PRO FC for a much more streamlined installation. Refer to the Pre-configuration Sheet for the exact pre-configuration of your PRO FC, the default configured is for RAID 5 (efficient protection mode) and pre-formatted for Mac OS X. Just simply follow the installation steps outlined in this manual, and you will up and running in no time. For Windows operation, a short format process will be required.

1.1. Safety Considerations

1.1.1. SAFETY CONSIDERATIONS



WATER AND MOISTURE
To reduce the risk of fire or electrical shock, do not expose unit to rain or moisture. Do not operate unit near water – such as: bathtub, washbowl, kitchen sink or laundry tub, wet basement, or near a swimming pool.

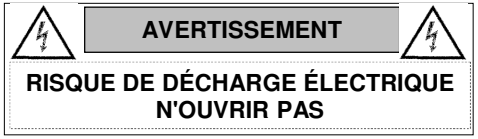
STABILITY
Do not place this unit on an unstable cart, stand, bracket, or table. Unit may fall, causing serious injury.

VENTILATION
Do not block front and rear ventilation. Proper airflow is required to ensure reliable operation and prevents unit from over heating. Do not place unit in an enclosed space where no or insufficient ventilation is available.

ELECTRICAL
Do not defeat the safety purpose of the grounding power plug. The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against them.

SERVICING
Do not attempt to service this unit yourself. Opening or removing the top, side and rear covers will expose you to dangerous voltages or other hazards.

1.1.2. CONSIDÉRATIONS DE SÉCURITÉ



EAU ET HUMIDITÉ
Pour réduire le risque de feu ou de choc électrique, n'exposez pas d'unité pour pleuvoir ou l'humidité. Ne faites pas marcher d'unité près de l'eau – comme; la baignoire, la cuvette, l'évier ou la cuve de blanchisserie, la cave mouillée ou près d'une piscine.

STABILITÉ
Ne placez pas cette unité sur un chariot instable, un éventaire, une parenthèse ou une table. L'unité peut tomber, en provoquant la blessure sérieuse.

VENTILATION
Ne bloquez pas de devant et élevez la ventilation. L'écoulement d'air nécessaire est tenu de garantir l'opération sûre et prévient l'unité de sur le chauffage. L'unité ne peut pas placé dans un espace fermé où aucune ventilation ou dans suffisant n'est disponible.

ÉLECTRIQUE
Ne vainquez pas le but de sécurité de la prise de courant de pouvoir de bases. La corde de pouvoir devrait être mise en déroute pour qu'ils ne seront pas probablement marchés sur ou pincés par les articles placés sur ou contre eux.

ENTRETIEN
N'essayez pas d'assurer l'entretien de cette unité vous-même. En s'ouvrant ou le fait d'enlever le haut, le côté et les couvertures arrière vous exposeront aux voltages dangereux ou à d'autres hasards.

1.1.3. SAFTY BERÜCKSICHTIGUNGEN

WASSER UND FEUCHTIGKEIT
Um eine Brand- oder Elektroschockgefahr weitgehend auszuschließen, Gerät nicht Regen oder Feuchtigkeit aussetzen. Gerät nicht in der Nähe von Bade- oder Waschwannen, Wasch- oder Spülbecken, feuchten Kellern oder Schwimmbecken betreiben.

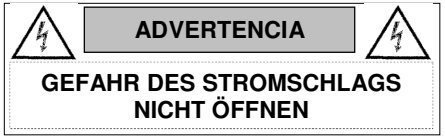
STABILITÄT
Das Gerät nicht auf wacklige Karren, Ständer, Halterungen oder Tische stellen, da es herunterfallen und Verletzungen verursachen könnte.

BELÜFTUNG
Vordere und hintere Belüftungsöffnungen nicht versperren. Das Gerät muss ausreichend be- und entlüftet werden können, damit es sich nicht während des Betriebs überhitzt. Daher darf das Gerät nicht in geschlossenen Räumen aufgestellt werden, in denen keine ausreichende Be- und Entlüftung gewährleistet ist.

STROMVERSORGUNG
Nicht den Schukostecker modifizieren. Das Stromkabel sollte so verlegt werden, dass es nicht durch Auftreten oder durch spitze oder scharfe Gegenstände beschädigt werden kann.

WARTUNG
Das Gerät nicht eigenmächtig warten. Durch das Öffnen des Geräts (Abziehen der oberen, seitlichen und hinteren Abdeckung) setzen Sie sich lebensgefährlichen Spannungen aus.

1.1.4. CONSIDERACIONES DE SEGURIDAD



AGUA Y HUMEDAD
Para reducir el riesgo de fuego o electrochoque, no exponga la unidad para llover o humedad. No haga funcionar la unidad cerca del agua – como; bañera, lavatorio, fregadero o tina de lavandería, sótano mojado o cerca de una piscina.

ESTABILIDAD
No coloque esta unidad en un carro inestable, soporte, soporte o mesa. La unidad puede caerse, causando la herida seria.

VENTILACIÓN
No bloquee delantero y críe la ventilación. El corriente de aire apropiado es requerido asegurar la operación confiable y previene la unidad de sobre la calefacción. La unidad no puede colocado en un espacio incluido donde ninguna ventilación o en suficiente está disponible.

ELÉCTRICO
No derrote el objetivo de seguridad del enchufe de poder que da buenos conocimientos. La cuerda de poder debería ser derrotada de modo que ellos probablemente no sean andados en o pellizcados por artículos colocados sobre o contra ellos.

REVISIÓN
No intente atender esta unidad usted mismo. Abriéndose o quitar la cumbre, el lado y las tapas traseras le expondrán a voltajes peligrosos u otros riesgos.

1.2. System Requirements

- Windows XP / Vista / Server / 2000 / 32 & 64-bit.
- Mac OS X 10.4 or higher.
- Apple Power Mac G5, Mac Pro, Windows compatible PC.
- 2 or 4Gb Fibre Channel Port with optical LC connection.

1.3. Technical Support

Phone	818-435-6007
FAX	818-576-0324
E-mail	support@dulcesystems.com
Web	www.dulcesystems.com

If the product requires service, please contact Dulce Systems' Technical Support and obtain an RMA number. Ship the product properly packaged to:

Dulce Systems
Attn: RMA
9620 Topanga Canyon Place, Suite E Chatsworth, CA 91311

2. Getting Started

The PRO FC comes pre-assembled and almost ready for use, just install the Disk Modules, attach the Fibre Channel to the computer or the switch, and install the JAVA RAID Manager. If you are using a Mac, you are good to go, by default the unit is pre-formatted for Mac OS X operation. For Windows, a small format procedure is needed.

2.1. Packaging

Please do not discard the boxes and packing materials in case you might need to reuse them later. Always ship the product in its original packaging. Improperly packaged products will be subjected to shipping damage, for which you will be liable for the repair.

2.2. Check List

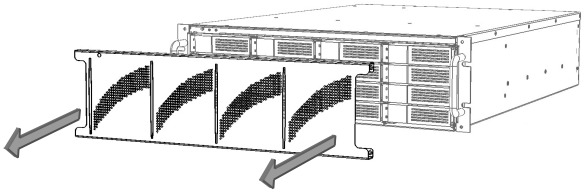
- Installation and User's Manual.
- Power Cord (North America user only).
- Set of keys.
- 3u 19" rackmount 16 disk bay system enclosure.
- 16 Disk Modules.
- One Ethernet Cable.
- One 3-meter LC to LC optical Fibre Channel cable.
- One SFP Optical Transceiver.
- Rackmount rails (optional)

3. Overview

3.1. The Bezel

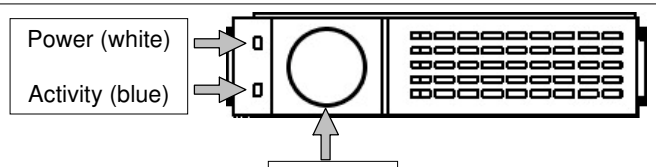
The front bezel can be easily removed to access the Disk Modules. The bezel is held on by four snap pins located at each of the four corners.

Use both hands, push from behind the left and right side of the bezel. Access through the rack mount handles.

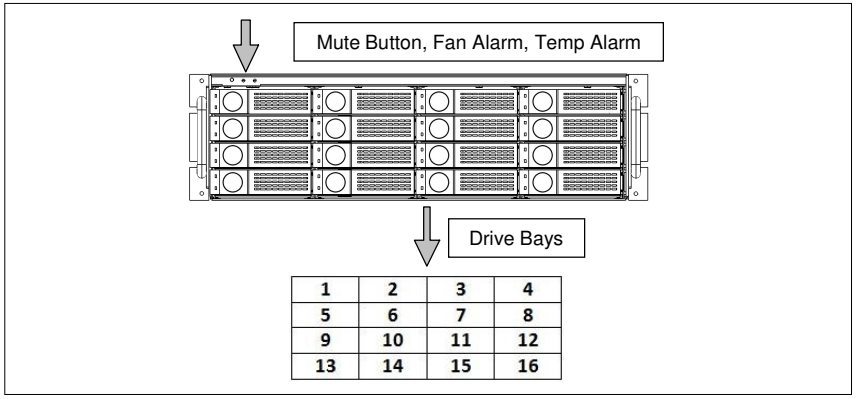


3.2. Disk Modules, Indicators, Controls, Connections

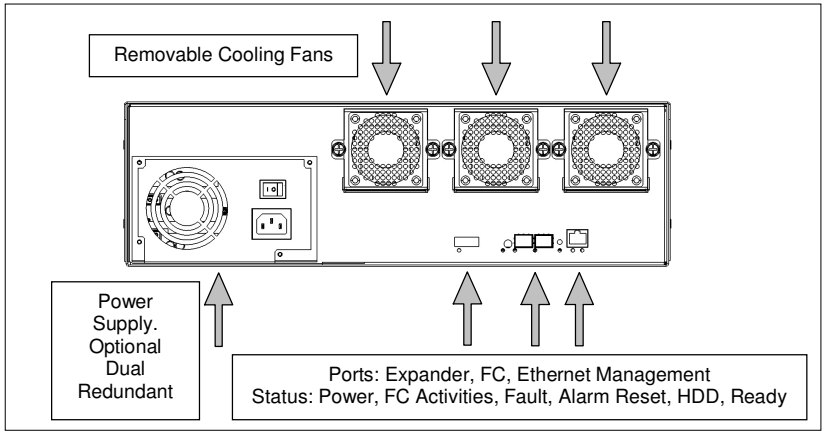
Disk Module



Front view with bezel removed



Back view


Removable Cooling Fans
Power Supply. Optional Dual Redundant
Ports: Expander, FC, Ethernet Management
Status: Power, FC Activities, Fault, Alarm Reset, HDD, Ready

4. Installation

Please follow these few steps to install the PRO FC. This process typically takes about 30 minutes to complete.

Overview of installation:

- Rackmount installation
- Disk Module Installation
- FC Cable Installation
- Ethernet Configuration
- RAID Manager Installation

By default, the PRO FC is shipped pre-configured in RAID 5 mode and pre-formatted for Apple Mac OS X. Check the Pre-configuration Sheet for your exact configuration.

Windows operation will require a format/partition process. The PRO FC is shipped already pre-configured in RAID 5. Simply run the Windows Disk Management utility to prepare the RAID for Windows usage.

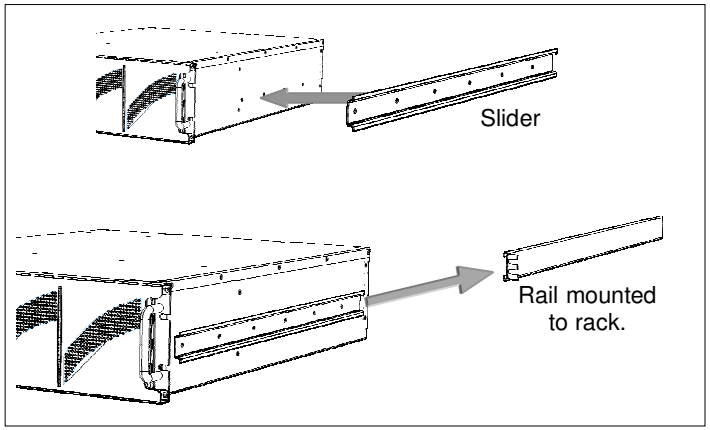
4.1. Rackmount Installation

The PRO FC can be rackmounted to a standard 19" rack. 3u height space is required. An optional rackmount kit is available for 24" to 30" depths.

Mount the left and right rails to the rack, ensure sufficient 3u space is available. Adjust depth as required.

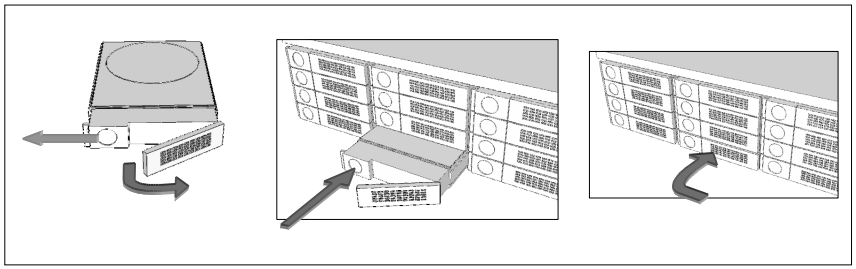
Mount the left and right sliders on the PRO FC.

The PRO FC loaded with Disk Modules will be heavy, install the PRO FC to the rack before installing the drives will make it easier. Install the PRO FC carefully on the rack by aligning the sliders in the rails.



4.2. Disk Module Installation

Remove the front bezel. Install each marked Disk Module into the slot indicated. Pull the lock of the Disk Module left to open the latch. Insert into slot until latch begins to close, close latch to lock Disk Module into place.



DO NOT ship the PRO FC with the Disk Modules installed, the Disk Modules MUST be packaged separately in a single or multi-pack to properly protect them during shipment.

4.3. FC Cable Installation

Install the SFP into one of the FC ports in the rear of the PRO FC, then install the LC to LC optical Fibre Channel Cable in to the SFP, connect the other end to your FC HBA in the computer or the FC switch.

SFP - Remove the protective covering. Insert into FC port label up.

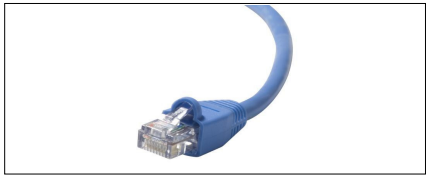
LC to LC cable - Remove the protective tip covering. Insert into SFP.

4.4. Drivers

Drivers are not needed to operate the PRO FC. But the Fibre Channel adapter the PRO FC connects to will need drivers, please refer to the requirements of the adapter.

4.5. Ethernet Configuration

The PRO FC uses the built-in Ethernet port for RAID management, connect the PRO FC to your existing network.



The PRO FC will use the network DHCP for automatic IP Address assignment if this is enabled on your network, otherwise the PRO FC defaults to the static IP address below. After connection is made, the default static IP Address can be changed at RAID Manager > Administration > IP Connection.

Auto Assign (DHCP)	or	169.254.32.10

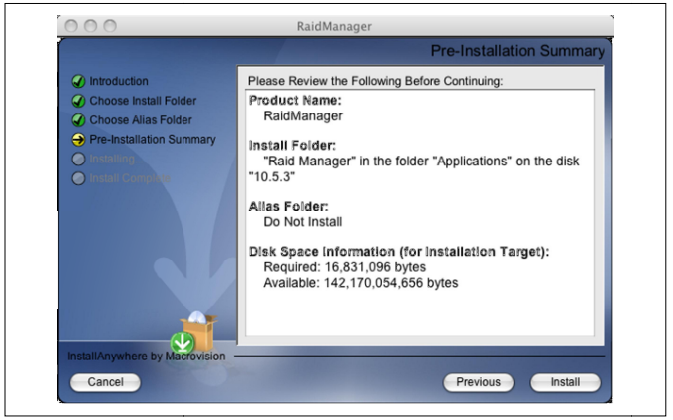
4.6. RAID Manager Installation

The PRO FC uses a Java based RAID Manager to configure and manage the RAID. Please visit our web site and download the RAID Manager Installer.

Download From:	www.dulcesystems.com/download

Start the install program from the Downloads folder on the dock after download completes..

Save the install.exe on the desktop then run it after download is complete.



Mac screen shot shown. Windows will be similar.

Follow the on screen prompts to complete the installation. See next section for RAID Manager operational instructions.

5. RAID Manager Operations

5.1. Start RAID Manager

Start the RAID Manger from the RAID Manger folder.

Applications folder > RAID Manager folder

All Programs menu > RAID Manger folder

5.2. Connect RAID Manger to PRO FC

5.2.1. PRO FC Discovery

RAID Manager needs to know the IP Address of the PRO FC, use the Search or Advanced method to auto discover or use Manual if you know the IP Address.

Normal Mac users should use the Advanced method due to the security nature of the Mac operating system. Windows and Mac users with root user access can use Search.

Windows and Mac root user.
Dulce Raid Manager
Dulce RAID Manager
Systems Found
Click Search to Detect Systems or
Click Manual to Manually enter an IP Address
Click Advanced to change the IP search range. The default settings will search for all systems on the local subnet.
Advanced
Search
Cancel Search
Demo
Manual
Search for a system.
Normal Mac users use Advanced.

Advanced / Search method could take up to 5 minutes to cover the entire search range. This operation is only needed to be performed once, after discovery the RAID Manager will remember the IP Address.

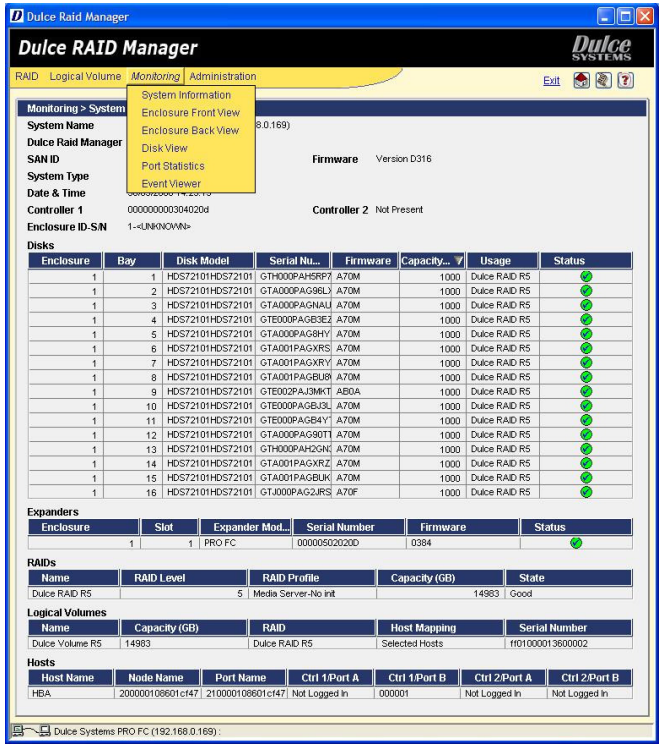
5.2.2. Login

The Systems Found list will show the discovered PRO FCs. Double click on an entry to start the login.

Username:	admin
Password:	admin

5.3. RAID System Information

The System Information screen (under the Monitoring menu) provides a quick overview of the PRO FC configuration. It shows the status and configuration of the physical drives connected, the RAID setup and the Volumes assigned under each RAID.



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5.4. RAID Creation

A new PRO FC is normally pre-configured and formatted, you might not need to go through this process, check the Pre-Configuration sheet that came with the PRO FC for details.

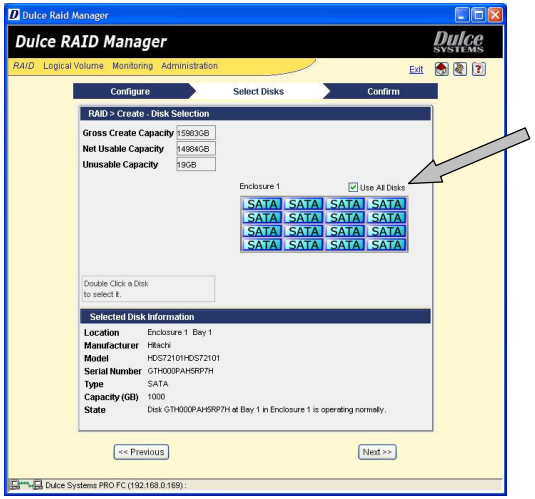
If you are changing the RAID configuration, you will need to 1st delete the RAID then create a new RAID, see the Delete RAID section in this manual.

Creating a RAID set is easy; 1st create a RAID set of your choice with the disk drives attached. 2nd create a Logical Volume under the new RAID set.

Click on the RAID menu and select Create. Select your desired options and click Next. A number of preset RAID Profile is provided.

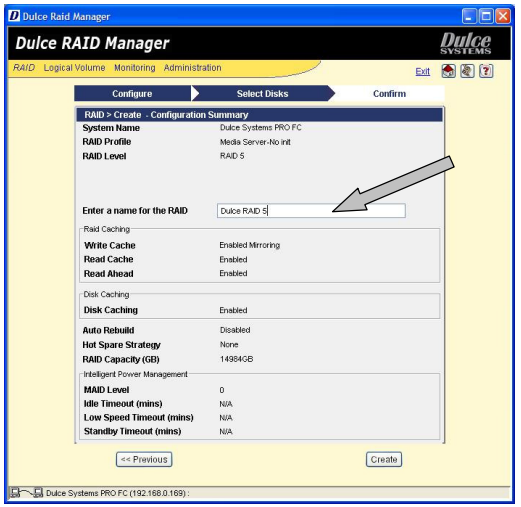
The Media Server – No Init profile will give you instant RAID availability, no need to wait for long RAID format.

Check the Use All Disks or individually select each disk for the RAID.

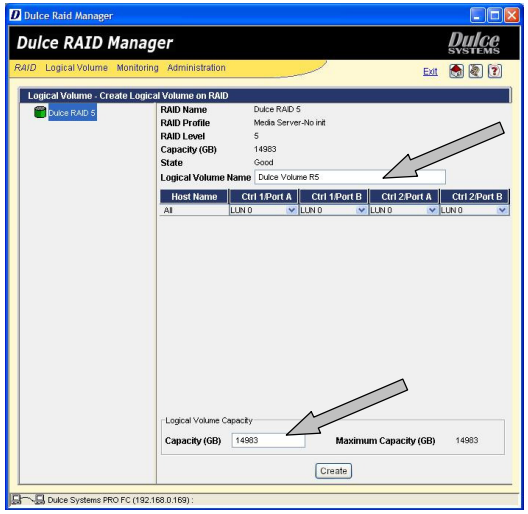


Enter a name for the RAID and Logical Volume, they are only used within RAID Manager, this is not a name you will see in your operating system.

You can use 'Dulce RAID' for the RAID name and 'Dulce Volume' for the Volume name.



Enter the desired Capacity for the Logical Volume, then lastly click on Create.



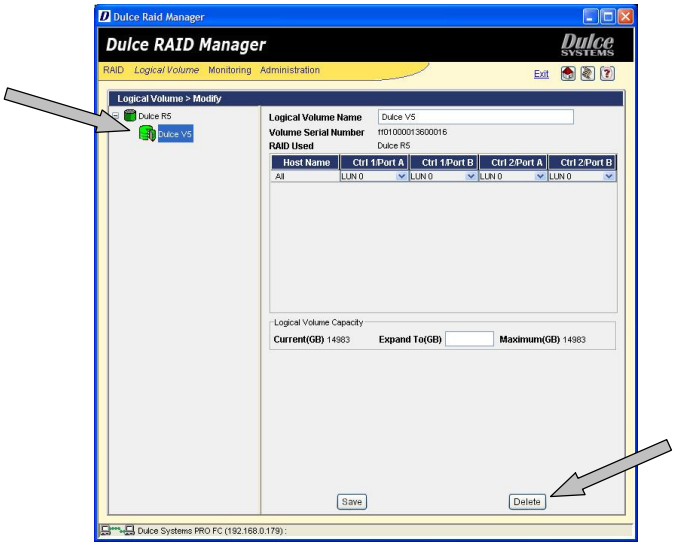
Attach the PRO FC to your computer. You would see the PRO FC as an available disk in the format utility of your operating system.

5.5. RAID Deletion

Deleting a Logical Volume and RAID will destroy all data.

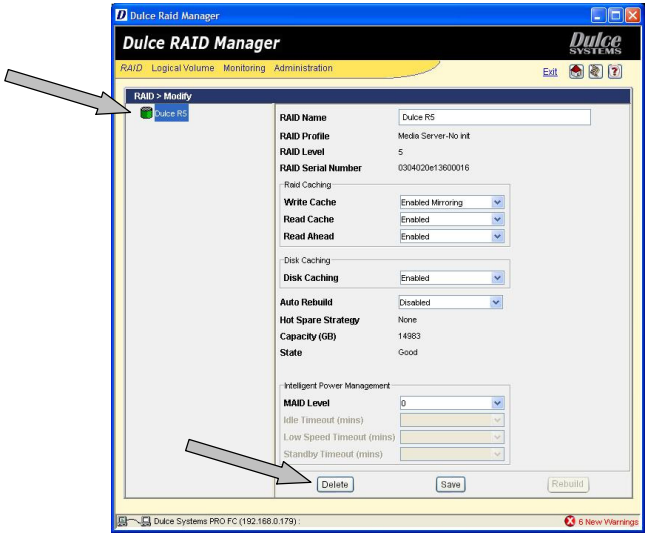
1st: Delete the Logical Volume, from the Logical Volume menu select Modify.

On left side, expand the RAID to expose the Logical Volume under it. Click on the Logical Volume to select it, click on Delete.



2nd: Delete the RAID, from the RAID menu select Modify.

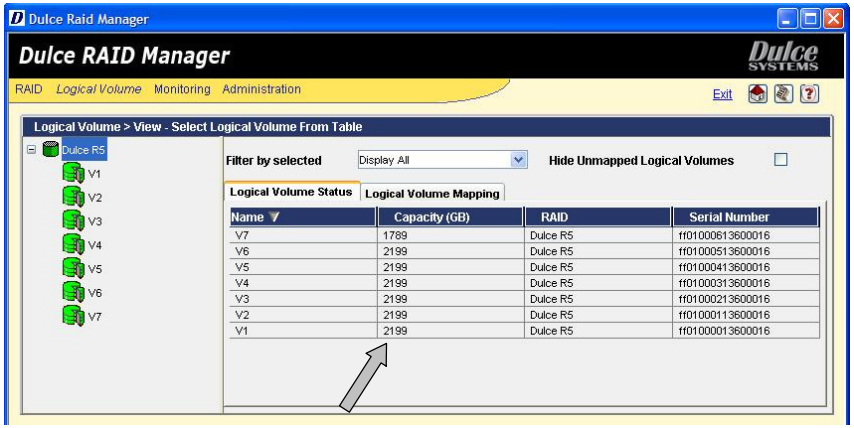
On the left side, click on the RAID to select it, then Delete.

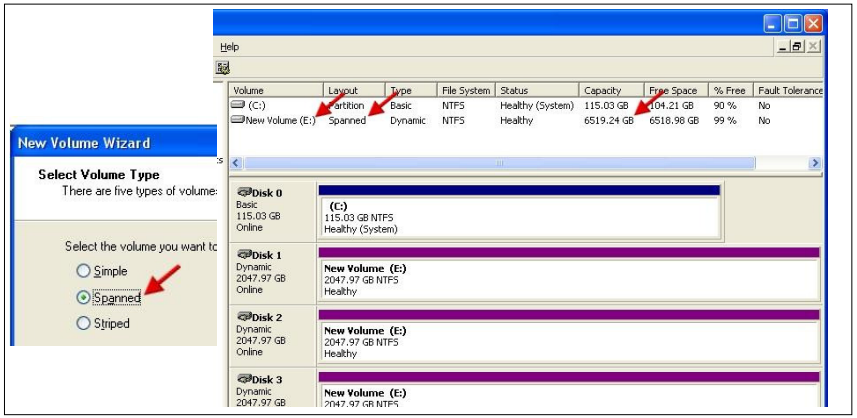


5.6. Create >2TB RAID Set for Windows XP (32bit):

This only applies to Windows XP (32 bit) where it has a 2TB disk size limitation.

Create a RAID of your choice with the number of desired disk drives, then create multiple Logical Volumes of 2TB size. This will present to Windows XP as several disks of 2TB sizes. Use Windows Disk Manager to Span them together (not Stripe) to create one drive letter of the sum of all the <=2TB sized disks.



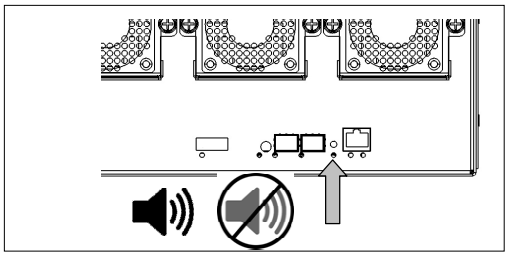

New Volume Wizard
Select Volume Type
There are five types of volume
Select the volume you want to
Simple
Spanned
Striped
Help
Volume
Layout
Type
File System
Status
Capacity
Free Space
% Free
Fault Tolerance
(C:) Partition Basic NTFS Healthy (System) 115.03 GB 104.21 GB 90 % No
New Volume (E:) Spanned Dynamic NTFS Healthy 6519.24 GB 6518.98 GB 99 % No
Disk 0 Basic 115.03 GB Online
(C:) 115.03 GB NTFS Healthy (System)
Disk 1 Dynamic 2047.97 GB Online
New Volume (E:) 2047.97 GB NTFS Healthy
Disk 2 Dynamic 2047.97 GB Online
New Volume (E:) 2047.97 GB NTFS Healthy
Disk 3 Dynamic 2047.97 GB
New Volume (E:)

6. Alarm Conditions / Degraded RAID Set

There are several possible sources for alarms, the front indicators and the RAID Management will provide the details of the alarm.

Mute Alarm:

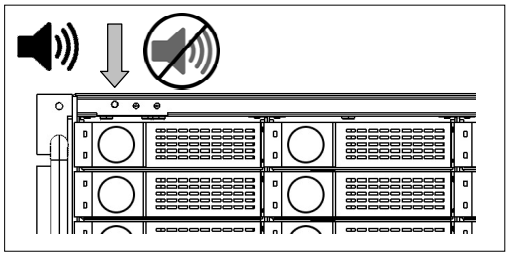
1) Alarm Reset button in the rear of unit.



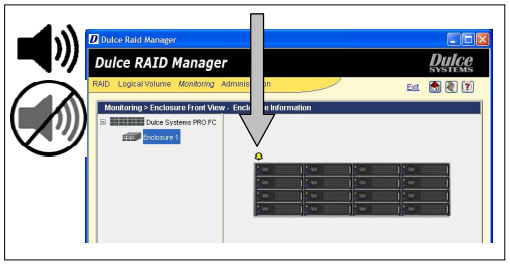
Enclosure Alarm

- Temperature (enclosure detected over heating condition)
- Fan (enclosure cooling fan not operational, could lead to over heating)

2) Reset button at the top front left of unit.



3) RAID Manager GUI.



RAID Alarm

- Degraded RAID Set (one or more drives not detected or down)
- Temperature (RAID Controller detected over heating)

RAID Manager > Monitoring > Enclosure Front/Back View. Double click on the yellow bell.

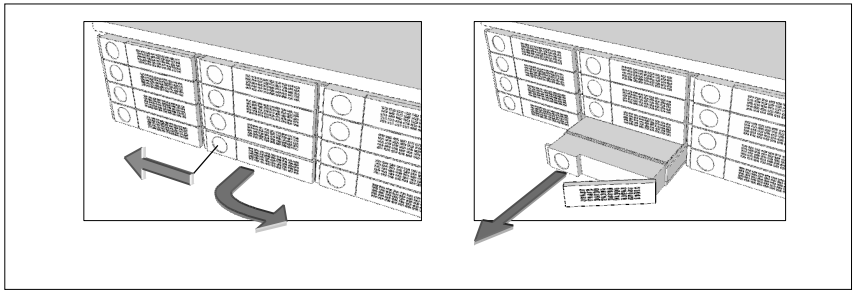
The Event Viewer screen provides a log of events which triggered the alarm. To view it, from the Monitoring menu, click on Event Viewer.

6.1. Replacing a Disk Module

A defective Disk Module can be easily replaced. Hot swapping is allowed without interruption to your workflow if the RAID is operating in one of the drive redundant RAID mode (1,5,6).

In a redundant RAID mode, rebuild will start automatically after replacement of a defective module.

- Pull the lock left to unlock the latch.
- Pull latch forward and right to move the module out.



The RAID rebuild will consume some processing power from the overall operation speed of the PRO FC, the rebuild can be suspended during time sensitive operations.

From RAID Manager, click on RAID > Modify. Select the RAID on the left side, then click on Stop Rebuild at the lower right.

The audible alarm will sound, follow the Alarm Condition / Mute Alarm to handle it.

7. Formatting and Partitioning

7.1. Apple OS X Formatting

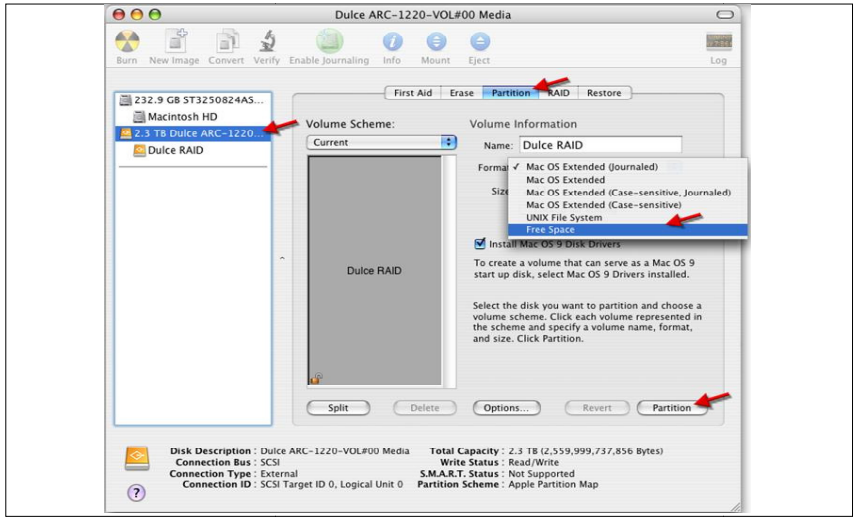
The PRO FC are shipped pre-configured for Mac OS X, the RAID will appear on the desktop after driver installation and reboot.

Should it be necessary to re-format and partition the RAID, use the Apple Disk Utility.

To start Disk Utility, move pointer to upper left corner of screen, click on Go then click on Utilities. Locate and launch Disk Utility.

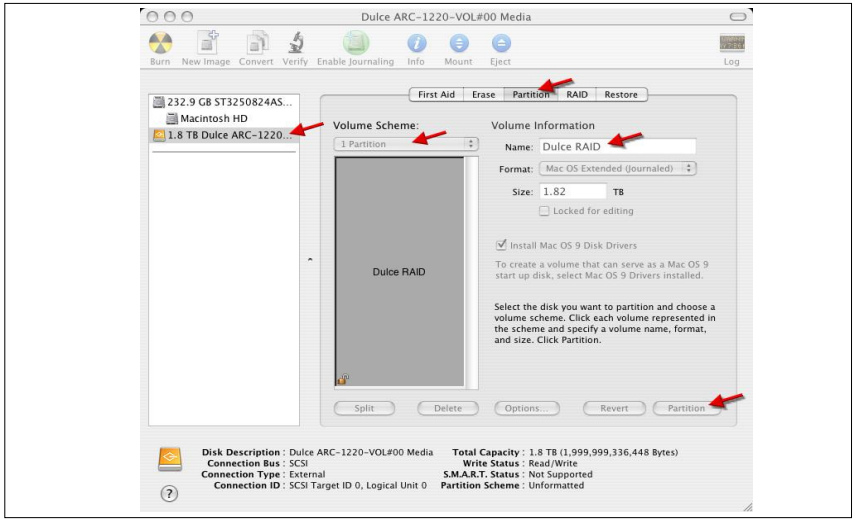
7.1.1. Erase an existing partition

Select the RAID on left, click on Partition tab, select Free Space. Click on Partition on lower right.



7.1.2. Create a new partition

Select Dulce on the left side drive list, click on Partition tab, change Volume Scheme to 1 Partition, change Name as desired, click on Partition on lower right.



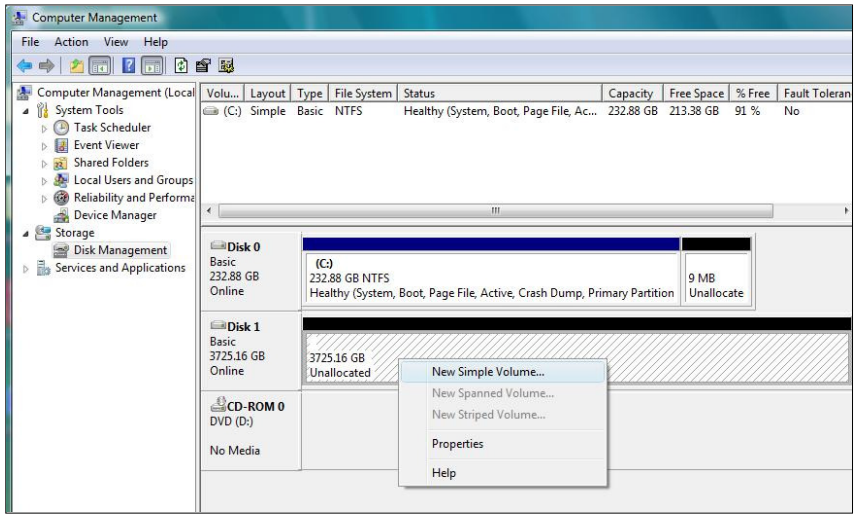
The drive will appear on the desktop after successful completion of the Partition.

7.2. Windows XP / Vista Formatting

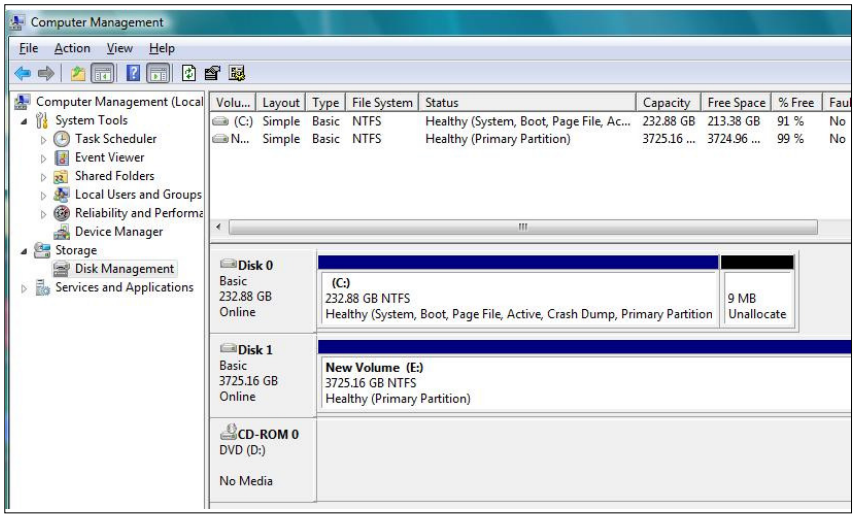
Start Disk Management (can be found at Control Panel > System and Maintenance > Administrative Tools > Computer Management. Under Storage.)

If the RAID shows up as Unknown / Not Initialized, right click on the disk and Initialize it.

If the drive is larger than 2TB, if using Vista, right click over the disk and Convert to GPT Disk. Windows XP 32 bit does not support larger than 2TB capacity. Configure with multiple capacities of 2TB or less.



Right click the Unallocated segment and select New Simple Volume. Enter the desired Volume Size, assign the desired Drive Letter or Path, check Perform a Quick Format at the Format Partition screen.



8. RAID Level Descriptions

Although the RAID Controller supports a large variety of RAID Levels, RAID 0 or RAID 3 are most commonly used for video and content creation purpose.

RAID Level	Description	Advantage	Disadvantage	Ideal for
0	Striping.	Highest performance.	No disk redundancy, one drive failure will lose all data.	Highest resolution HD, 2K, and maximum multiple streams.
1	Mirroring.	Highest redundancy.	Less cost efficient for redundancy, loses ½ disk capacity.	Data protection is paramount, maximum disk failure protection.
3	Striping with a dedicated parity drive.	Efficient drive redundancy, 1 drive used for parity.	Loses 1 disk drive capacity.	Well balanced for video requiring performance and redundancy.
5	Striping the parity across all drives.	Efficient drive redundancy, parity distributed to all drives.	Loses 1 disk drive capacity.	Well balanced for file server requiring performance and redundancy.
6	Striping with two dedicated parity drives.	Double drive redundancy, 2 drives used for parity.	Loses 2 disk drive capacity.	Mission critical.
JBOD	Just a Bunch of disks.	Each drive can be accessed individually from operating system.	No redundancy.	Audio applications.
RAID + Spare	A drive is set aside as an online hot spare.	Automatic rebuild of a failed drive.	Loses another drive capacity. (In addition to the drive(s) needed for the RAID level selected.)	Minimizes degraded RAID level exposure time.

9. Limited Warranty

WHAT THE WARRANTY COVERS

Dulce Systems warrants your product against any defect in material and workmanship and conforms to Dulce published specifications under normal use.

WHAT THE WARRANTY DOES NOT COVER

The warranty does not cover equipment which has been damaged due to accident, misuse, abuse, fire, flood, "Acts of God," or other contingencies beyond our control; use of incorrect line voltages; improper or insufficient ventilation; failure to follow operating instructions; or improper or unauthorized repair; improperly packaged for shipping; packaged in non-approved shipping container; shipping damage.

The warranty is voided by removal or alteration of the product or parts identification labels.

Dulce has no liability for general, consequential, incidental or special damages. These include loss of recorded data, the cost of recovery of lost data, lost profits and the cost of the installation or removal of any Products, the installation of replacement Products, and any inspection, testing, or redesign caused by any defect or by the repair or replacement of Products arising from a defect in any Product.

WHAT THE WARRANTY PERIOD IS

Dulce Systems warrants your PRO FC product for 36 months and if the product is registered with Dulce within 30 days of purchase, we will extend the warranty for another 6 months totaling 42 months. We warrant the Duo for 36 months. The warranty period begins at the date of shipment to the original end user, company or organization.

Our warranty applies to repaired or replaced Products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced Product, whichever is longer.

WHAT WE WILL DO TO CORRECT THE PROBLEM

We may elect which remedy or combination of remedies to provide at our sole discretion. We shall have a reasonable time after determining that a defective Product exists to repair or replace a defective Product. Our replacement Product under its limited warranty will be manufactured from new or reconditioned parts.

Your exclusive remedy for any defective Product is limited to the repair or replacement of the defective Product.

We will return the repaired or replacement Product to you prepaid using the same method of shipping (ex: overnight, ground, 2nd day, …) as was shipped to us. If a more expedited return shipping method is required, extra charges might apply at our discretion.

HOW YOU CAN GET SERVICE

Contact our Technical Support to obtain a RMA (Return Materials Authorization) number. The model number, serial number, and description of the problem will be required. A valid proof of purchase might be required to further validate the Products warranty eligibility, the valid proof of purchase document must show the product model, serial number, purchase date, and supplier name. If the valid proof of purchase is not available, the original manufacturing date of the product will be used to determine the warranty period.

No returns will be accepted without a RMA number. We reserve the right to refuse the delivery of the return.

You shall bear all shipping, packing and insurance costs and all other costs, excluding parts and labor, necessary to effectuate repair or replacement under this warranty.

All products returned to us must be shipped in the original packaging or Dulce approved packaging. If you do not have the original packaging, call us to request packaging. A nominal fee will be charged for the requested packaging and for shipment. Ship the RMA to us pre-paid.

Products that are improperly packaged for shipping; packaged in a non-approved shipping container; or incur shipping damages are not covered under warranty.

HOW STATE LAW RELATES TO WARRANTY

In the United States, some states do not allow exclusion or limitation of incidental or consequential damages, so the limitations above may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

10. Product Registration

R E G I S T E R N O W
ADDS 6 MONTHS

Register your product within 30 days of purchase
and **extend your warranty by another 6 months.**

1 minute = 6 months

It will take only one minute to register and you'll get 6 months in return!

By registering your PRO FC, the standard 36 months warranty will be extended for another 6 months. That's a total of 42 months (3 years and 6 months warranty.) The longest warranty in the industry!

Please visit our web site and register online.

www.dulcesystems.com/register

A valid proof of purchase might be required to further validate the Products warranty eligibility, the valid proof of purchase document must show the product model, serial number, purchase date, and supplier name. If the valid proof of purchase is not available, the original manufacturing date of the product will be used to determine the warranty period.

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